

CENTRAL MACHINERY®

MICRO MILL/DRILL MACHINE

Model 47158

ASSEMBLY AND OPERATING INSTRUCTIONS



Distributed Exclusively by



**HARBOR FREIGHT
TOOLS**



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For technical questions, please call 1-800-444-3353.

SPECIFICATIONS TABLE

Electrical Requirements	120 V / 60 Hz / 1/5 HP
2 Speed Ranges	High: 100-2,000 RPM / Low: 100-1,000 RPM
Maximum Chuck Capacity	25/64" Drill Bit / 25/64" End Mill / 3/4" Face Mill
Maximum X Travel	9"
Maximum Y Travel	4"
Maximum Z Travel	8-1/2"
X, Y, Z Graduations	.001" / Line
Table Size	9-3/8" x 5-3/8"
Table Slot	5/16" x 5/8"
Throat Depth	5-1/2"
Swing Diameter	11"
Base Size	10-1/8" x 9-3/8"
Spindle Stroke	1-3/16"
Spindle Taper	MT2
Weight	103 Pounds

SAVE THIS MANUAL

You will need this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance and cleaning procedures, parts list and assembly diagram. Keep your invoice with this manual. Write the invoice number on the inside of the front cover. Keep this manual and invoice in a safe and dry place for future reference.

GENERAL SAFETY WARNINGS AND PRECAUTIONS

1. **KEEP WORK AREA CLEAN AND DRY.** Cluttered, damp, or wet work areas invite injuries.
2. **KEEP CHILDREN AWAY FROM WORK AREA.** Do not allow children to handle this product.
3. **STORE IDLE EQUIPMENT.** When not in use, tools and equipment should be stored in a dry location to inhibit rust. Always lock up tools and equipment, and keep out of reach of children.
4. **DO NOT USE THIS PRODUCT IF UNDER THE INFLUENCE OF ALCOHOL OR DRUGS.** Read warning labels on prescriptions to determine if your judgement or reflexes are impaired while taking drugs. If there is any doubt, do not attempt to use this product.

5. **USE EYE AND BREATHING PROTECTION.** Wear ANSI approved safety impact eyeglasses when using this product. Also, use an ANSI approved dust mask if the operation produces excessive dust. ANSI approved safety impact eyeglasses and dust masks are available from Harbor Freight Tools.
6. **DRESS SAFELY.** Do not wear loose clothing or jewelry, as they can become caught in moving parts. Wear a protective hair covering to prevent long hair from becoming caught in moving parts. If wearing a long-sleeve shirt, roll sleeves up above elbows.
7. **DO NOT OVERREACH.** Keep proper footing and balance at all times to prevent tripping, falling, back injury, etcetera.
8. **INDUSTRIAL APPLICATIONS MUST FOLLOW OSHA REQUIREMENT.**
9. **STAY ALERT.** Watch what you are doing at all times. Use common sense. Do not use this product when you are tired or distracted from the job at hand.
10. **CHECK FOR DAMAGED PARTS.** Before using this product, carefully check that it will operate properly and perform its intended function. Check for damaged parts and any other conditions that may affect the operation of this product. Replace or repair damaged or worn parts immediately.
11. **REPLACEMENT PARTS AND ACCESSORIES:** When servicing, use only identical replacement parts. Only use accessories intended for use with this product. Approved accessories are available from Harbor Freight Tools.
12. **MAINTAIN THIS PRODUCT WITH CARE.** Keep this product clean, dry, and keep all cutting bits sharp for better and safer performance.
13. **MAINTENANCE:** For your safety, service and maintenance should be performed regularly by a qualified technician.
14. **USE THE RIGHT TOOL FOR THE JOB.** Do not attempt to force a small tool or attachment to do the work of a larger industrial tool. There are certain applications for which this tool was designed. It will do the job better and more safely at the rate for which it was intended. Do not modify this tool, and do not use this tool for a purpose for which it was not intended.
15. **WARNING:** The warnings, precautions, and instructions discussed in this manual cannot cover all possible conditions and situations that may occur. The operator must understand that common sense and caution are factors, which cannot be built into this product, but must be supplied by the operator.

SPECIFIC PRODUCT WARNINGS AND PRECAUTIONS

1. **MAINTAIN A SAFE WORKING ENVIRONMENT.** Keep the work area well lit. Make sure there is adequate surrounding workspace. Always keep the work area free of obstructions, grease, oil, trash, and other debris. Do not use the Micro Mill/Drill Machine in areas near flammable chemicals, dusts, and vapors. Do not use the Micro Mill/Drill Machine in a damp or wet location.
2. **GROUND THIS PRODUCT.** The electrical Power Cord/Plug (part #128) for this product is equipped with a grounded, 3-prong Plug. Never remove the grounding prong or modify the Plug in any way. Do not use adapter plugs with this product. To comply with the National Electric Code, and to provide additional protection from the risk of electrical shock, this product should only be connected to a 120 Volt, 3-hole electrical outlet that is protected by a Ground Fault Circuit Interrupter (GFCI). (See Assy. Diagram.)
3. **IF AN EXTENSION CORD (not provided) IS USED, MAKE SURE TO USE ONLY UL APPROVED CORDS HAVING THE CORRECT GAUGE AND LENGTH.** (See Figure A.)

AWG RATING CHART - 120 VOLT

<i>CORD</i> → <i>LENGTH</i>	<i>25'</i>	<i>50'</i>	<i>75'</i>	<i>100'</i>	<i>125'</i>	<i>150'</i>	<i>175'</i>	<i>200'</i>
<i>AMPS</i>	<i>AWG</i>	<i>AWG</i>	<i>AWG</i>	<i>AWG</i>	<i>AWG</i>	<i>AWG</i>	<i>AWG</i>	<i>AWG</i>
<i>0-10.0</i>	18	18	16	16	14	14	12	12
<i>10.1-13.0</i>	16	16	14	14	14	12	12	12
<i>13.1-15</i>	14	14	12	12	12	12	12	---
<i>15.1-18</i>	14	12	12	12	12	12	---	---

FIGURE A

4. **KEEP ALL SAFETY GUARDS IN PLACE, IN PROPER ADJUSTMENT, AND IN PROPER ALIGNMENT.**
5. **REDUCE THE RISK OF ACCIDENTAL STARTING.** Make sure the Forward/Reverse Switch (part #125) is in the "OFF" position before plugging the Power Cord/Plug (part #128) into a grounded, 3-hole, 120 Volt, electrical outlet. (See Figure B, and Assy. Diagram.)
6. **PRIOR TO STARTING THE MICRO MILL/DRILL MACHINE, MAKE SURE ALL ADJUSTING KEYS AND WRENCHES ARE REMOVED FROM THE TOOL.**
7. **DO NOT USE ROTARY PLANERS, WIRE WHEELS, OR ROUTER BITS ON THIS MICRO MILL/DRILL MACHINE.**

8. **BEFORE DRILLING OR CUTTING, TURN ON THE MICRO MILL/DRILL MACHINE AND CHECK FOR BIT WOBBLE OR MACHINE VIBRATION.** If this is found, turn off the tool and correct the problem before using.
9. **SECURE THE WORKPIECE.** Whenever possible, secure the workpiece to the Worktable (part #105) with a vise or clamps. If the workpiece begins to spin, do not attempt to stop it with your hands. Turn the Micro Mill/Drill Machine OFF, and wait until the workpiece stops spinning before attempting to remove it. **(See Figure B, and Assy. Diagram.)**
10. **ALWAYS FEED THE WORKPIECE INTO AND AGAINST THE ROTATIONAL DIRECTION OF A BIT OR CUTTER.**
11. **WHEN DRILLING OR CUTTING SOFTER MATERIALS OR SMALL HOLES, USE THE HIGHER SPEEDS. WHEN DRILLING OR CUTTING HARDER MATERIALS OR LARGER HOLES, USE THE SLOWER SPEEDS.**
12. **NEVER LEAVE THE MICRO MILL/DRILL MACHINE UNATTENDED WHEN IT IS RUNNING.** Turn off the tool, and wait until it has completely stopped before leaving.
13. **ALWAYS UNPLUG THE MICRO MILL/DRILL MACHINE FROM ITS ELECTRICAL SUPPLY SOURCE BEFORE PERFORMING ANY INSPECTION, MAINTENANCE, OR CLEANING PROCEDURES.**
14. **WARNING:** Some dust created by power sanding, sawing, grinding, drilling, and other construction activities, contain chemicals known (to the State of California) to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are: lead from lead-based paints, crystalline silica from bricks and cement or other masonry products, arsenic and chromium from chemically treated lumber. Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles. *(California Health & Safety Code 25249.5, et seq.)*
15. **WARNING:** People with pacemakers should consult their physician(s) before using this product. Operation of electrical equipment in close proximity to a heart pacemaker could cause interference or failure of the pacemaker.

UNPACKING

When unpacking, check to make sure all the parts shown on the **Parts Lists on pages 12 and 13** are included. If any parts are missing or broken, please call Harbor Freight Tools at the number shown on the cover of this manual as soon as possible.

CLEANING, ASSEMBLY, AND MOUNTING INSTRUCTIONS

NOTE: For additional references to the parts listed below, refer to the **Assembly Diagram on page 14.**

To Clean The Micro Mill/Drill Machine:

1. When manufactured, the Micro Mill/Drill Machine has a special rust-proof coating applied to its outer parts and should be removed prior to use. To remove the coating, use a clean cloth and a mild solvent. Then, lubricate all moving parts with a premium quality, lightweight machine oil.

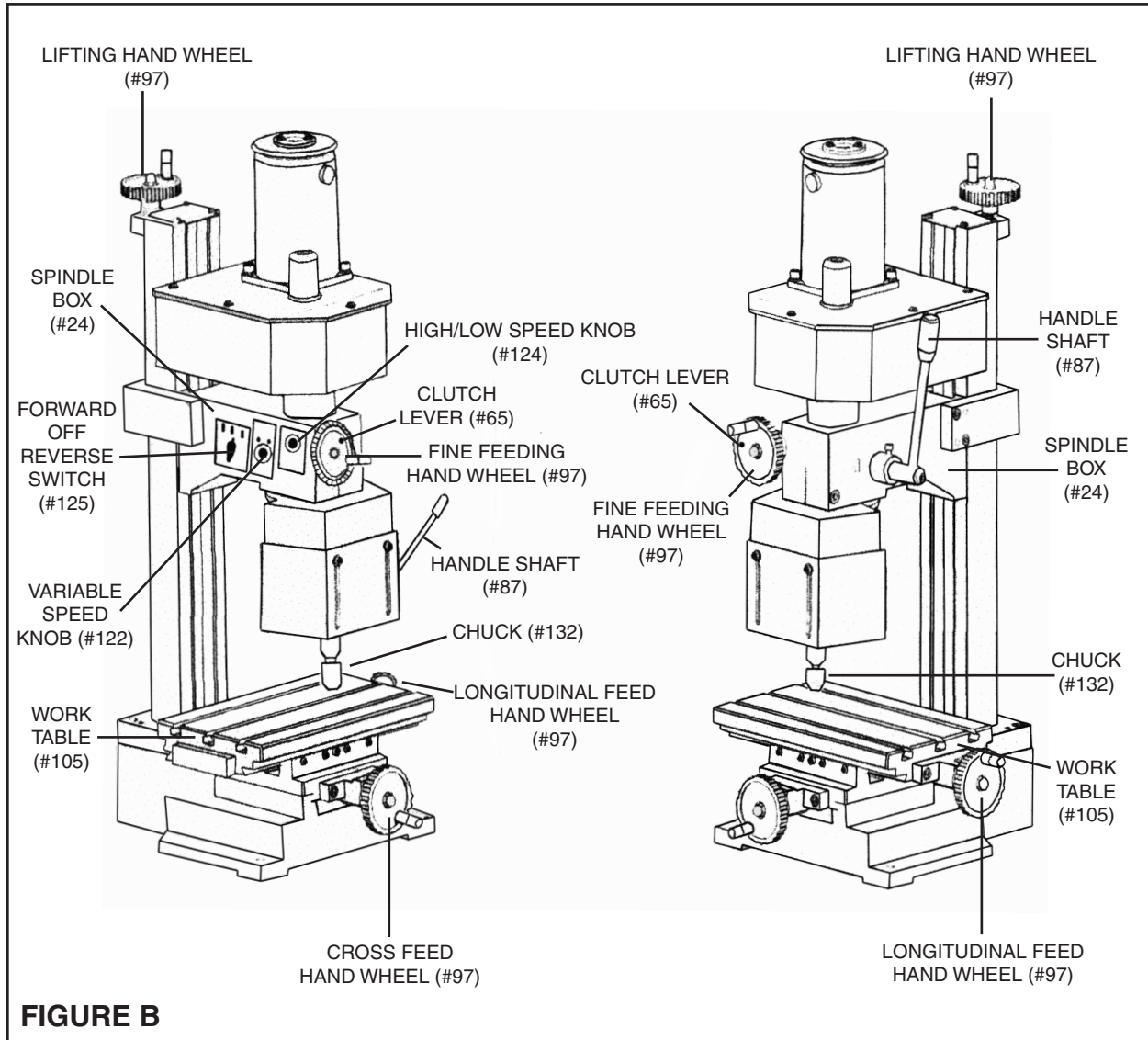
To Assemble The Micro Mill/Drill Machine:

1. The Lifting Hand Wheel, Longitudinal Feed Hand Wheel, Cross Feed Hand Wheel, and Fine Feeding Hand Wheel (parts #97) must be assembled prior to using the Micro Mill/Drill Machine. The four Wheels are each identical in size and shape, and must be properly attached to the Worm Shaft (part #61), the Lifting Screw (part #95), and the *two* Lengthways Screws (part #111).
(See Figure B, and Assy. Diagram.)
2. To attach the four Wheels (parts #97) to the Micro Mill/Drill Machine, insert one wheel each onto the end of the Worm Shaft (part #61), the Lifting Screw (part #95), and the *two* Lengthways Screws (part #111). Then firmly secure each Wheel, using one Washer (part #67), and one Top Nut (part #68).
(See Figure B, next page, and Assy. Diagram.)

To Mount The Micro Mill/Drill Machine On A Workbench:

1. **CAUTION:** Make sure the Micro Mill/Drill Machine is mounted on a flat, level, sturdy, workbench surface capable of supporting the weight of the Micro Mill/Drill Machine, additional tools, accessories, and the workpiece.

2. **NOTE:** When mounting the Micro Mill/Drill Machine on a workbench, you will need four 3/8" diameter bolts of appropriate length, four lock washers, and four nuts (not provided).



3. **With assistance**, position the Micro Mill/Drill Machine in the desired location on the top of the workbench. Use the four mounting holes in the Base (part #74) of the Micro Mill/Drill Machine as a template, and trace with a pencil on the top of the workbench *four 3/8" diameter mounting holes*. Then, temporarily remove the Micro Mill/Drill Machine from the workbench. **(See Assy. Diagram.)**
4. Where the four pencil marks are located, drill four 3/8" diameter holes completely through the top of the workbench.

5. Then, secure the Micro Mill/Drill Machine to the workbench, using the four 3/8" diameter bolts of appropriate length, four lock washers, and four nuts as mentioned in Step #2.

MACHINE ADJUSTMENT INSTRUCTIONS

NOTE: For additional references to the parts listed below, refer to the **Assembly Diagram on page 14.**

To Use The Adjustment Controls:

1. **CAUTION: ALWAYS TURN OFF THE MICRO MILL/DRILL MACHINE, UNPLUG ITS ELECTRICAL POWER CORD/PLUG (part #128), AND WAIT UNTIL IT COMPLETELY STOPS RUNNING BEFORE MAKING ANY ADJUSTMENTS.**
2. **To adjust the height of the Spindle Box** (part #24) to accommodate the work-piece being milled/drilled; turn the Lifting Hand Wheel (part #97) *clockwise* to raise the Spindle Box, and turn the Lifting Hand Wheel *counterclockwise* to lower the Spindle Box. (See Figure B, and Assy. Diagram.)
3. **To lower and raise the Chuck** (part #132); pull the Handle Shaft (part #87) *down* to lower the Chuck. Pull the Handle Shaft *up* to raise the Chuck. (See Figure B, and Assy. Diagram.)
4. **To adjust the fine feeding mechanism;** push in on the Clutch Lever (part #65) which is located on the Fine Feeding Hand Wheel (part #97). Turn the Fine Feeding Hand Wheel *clockwise* to bring the tip of the Chuck (part #132) *up*. Turn the Fine Feeding Hand Wheel *counterclockwise* to bring the tip of the Chuck *down*. The Fine Feeding Hand Wheel may be adjusted from 0" to 1-1/4" up or down. **NOTE:** For normal, manual feeding, make sure the Clutch Lever is pulled out. (See Figure B, and Assy. Diagram.)
5. **To move the Worktable (part #105) to the front and to the back;** turn the Longitudinal Feed Hand Wheel (part #97) *clockwise* to position the Worktable toward the front of the machine. Turn the Longitudinal Feed Hand Wheel *counterclockwise* to position the Worktable toward the back of the machine. (See Figure B, and Assy. Diagram.)
6. **To move the Worktable (part #105) to the right and to the left;** turn the Cross Feed Hand Wheel (part #97) *clockwise* to position the Worktable to the right. Turn the Cross Feed Hand Wheel *counterclockwise* to position the Worktable to the left. (See Figure B, and Assy. Diagram.)

7. **To turn the machine on/off, and adjust the rotational direction of the Chuck** (part #132); turn the Switch (part #125) from its “OFF” position to its “FORWARD” position to turn on the machine and for a clockwise rotation of the Chuck. Turn the Switch from its “OFF” position to its “REVERSE” position to turn on the machine and for a counterclockwise rotation of the Chuck. To turn off the machine, turn the Switch to its “OFF” position.
(See Figure B, and Assy. Diagram.)

8. **To adjust the speed at which the Chuck (part #132) rotates;** First set the High/Low Knob (part #124) until the letter “L” appears on its dial so that the Mirco Mill/Drill Machine begins running at its low speed range (100-1,000 RPM). Turn the Machine on. Note: Adjusting the High/Low Know (part #124) until the letter “H” appears on its dial, will run the machine at its high speed range (100-2,000 RPM). Once the HIGH or LOW speed range has been set, use the Variable Speed Knob (part #122) to fine-adjust the RPM at which the Chuck rotates.
NOTE: It is recommended to use a higher speed for softer materials or small holes. Use a lower speed for harder materials and larger holes. **(See Figure B, and Assy. Diagram.)**

OPERATING INSTRUCTIONS

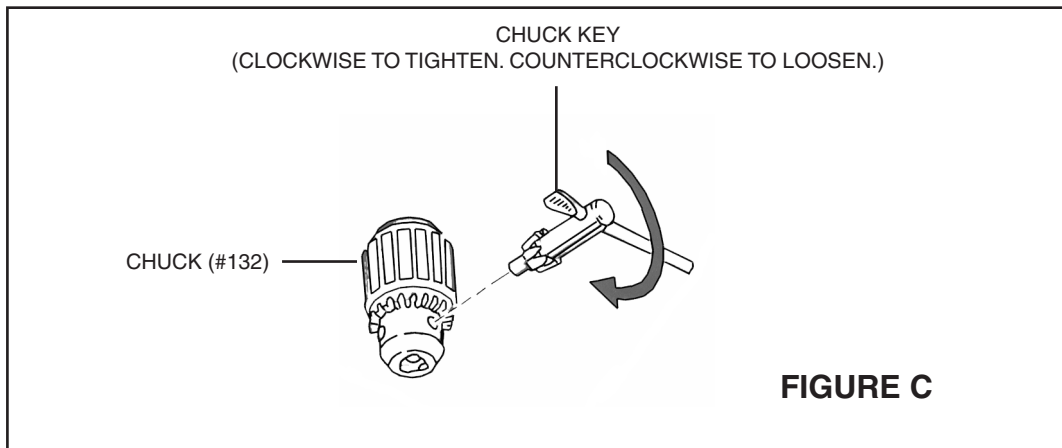
NOTE: For additional references to the parts listed below, refer to the **Assembly Diagram on page 14.**

1. **CAUTION: Make sure the Switch (part #125) on the Micro Mill/Drill Machine is in its “OFF” position. Then, plug the Power Cord/Plug (part #128) into the nearest 120 volt, grounded, 3-prong electrical outlet.** **(See Figure B, and Assy. Diagram.)**

2. Check to make sure the Handle Shaft (part #87) is in its full “UP” position.
(See Figure B, and Assy. Diagram.)

3. Place the workpiece on the Worktable (part #105) and, if possible, firmly secure the workpiece to the Worktable with clamps (not provided).
(See Figure B, and Assy. Diagram.)

4. Insert the shank of the drill bit/cutting tool (not provided) all the way up into the Chuck (part #132). Then, use the Chuck Key to tighten the Chuck onto the drill bit/cutting tool. **NOTE: There are three tightening/loosening holes in the Chuck. Make sure to use the Chuck Key in all three holes.**
(See Figures B, and C.)



5. If necessary, use the Lifting Hand Wheel, Longitudinal Feed Hand Wheel, Cross Feed Hand Wheel, and Fine Feeding Hand Wheel (parts #97) to adjust the Micro Mill/Drill Machine for the work to be done. **NOTE:** Do not attempt to make any further adjustments while the machine is running. (See Figure B, and Assy. Diagram.)
6. Set the High/Low Speed Knob (part #124) to the speed range required. **NOTE:** Do not attempt to make any further adjustments while the machine is running. (See Figure B, and Assy. Diagram.)
7. Set the Variable Speed Knob (part #122) to fine-adjust the speed range. **NOTE:** Do not attempt to make any further adjustments while the machine is running. (See Figure B, and Assy. Diagram.)
8. Turn the Switch (part #125) from its “OFF” position to either its “FORWARD” position or its “REVERSE” position, depending on the work to be done. **NOTE:** Do not attempt to turn the Switch directly from its “FORWARD” position to its “REVERSE” position, or its “REVERSE” position to its “FORWARD” position, while the machine is running. To change the rotational direction, turn the Switch to its “OFF” position. Wait until the machine completely stops. Then, change the rotational direction. (See Figure B, and Assy. Diagram.)
9. After testing the machine in Forward and Reverse position, evaluate the machine’s operation; check for loose or damaged parts, wobbling of the chuck or any other unusual situation. If the machine appears to be operating normally, the Micro Mill/Drill Machine is ready to use.
10. Once the work is completed, make sure to turn the Switch (part #125) to its “OFF” position. Wait until the machine has completely stopped. Unplug the Micro Mill/Drill Machine from its electrical power source. Remove the workpiece. And remove the drill bit/cutting tool.

INSPECTION, MAINTENANCE, AND CLEANING

NOTE: For additional references to the parts listed below, refer to the **Assembly Diagram on page 14.**

1. **CAUTION:** Always unplug the Power Cord/Plug (part #128) from its 120 volt electrical outlet before performing any inspection, maintenance, or cleaning.
2. **BEFORE EACH USE,** inspect the general condition of the Micro Mill/Drill Machine. Check for loose screws, misalignment or binding of moving parts, cracked or broken parts, damaged electrical wiring, and any other condition that may affect its safe operation. If abnormal noise or vibration occurs, have the problem corrected before further use. **Do not use damaged equipment.**
3. **DAILY:** With a soft brush, cloth, or vacuum, remove all debris from the Micro Mill/Drill Machine. Then, use a premium quality, lightweight machine oil to lubricate all moving parts.

PLEASE READ THE FOLLOWING CAREFULLY

THE MANUFACTURER AND/OR DISTRIBUTOR HAS PROVIDED THE PARTS LIST AND ASSEMBLY DIAGRAM IN THIS MANUAL AS A REFERENCE TOOL ONLY. NEITHER THE MANUFACTURER OR DISTRIBUTOR MAKES ANY REPRESENTATION OR WARRANTY OF ANY KIND TO THE BUYER THAT HE OR SHE IS QUALIFIED TO MAKE ANY REPAIRS TO THE PRODUCT, OR THAT HE OR SHE IS QUALIFIED TO REPLACE ANY PARTS OF THE PRODUCT. IN FACT, THE MANUFACTURER AND/OR DISTRIBUTOR EXPRESSLY STATES THAT ALL REPAIRS AND PARTS REPLACEMENTS SHOULD BE UNDERTAKEN BY CERTIFIED AND LICENSED TECHNICIANS, AND NOT BY THE BUYER. THE BUYER ASSUMES ALL RISK AND LIABILITY ARISING OUT OF HIS OR HER REPAIRS TO THE ORIGINAL PRODUCT OR REPLACEMENT PARTS THERETO, OR ARISING OUT OF HIS OR HER INSTALLATION OF REPLACEMENT PARTS THERETO.

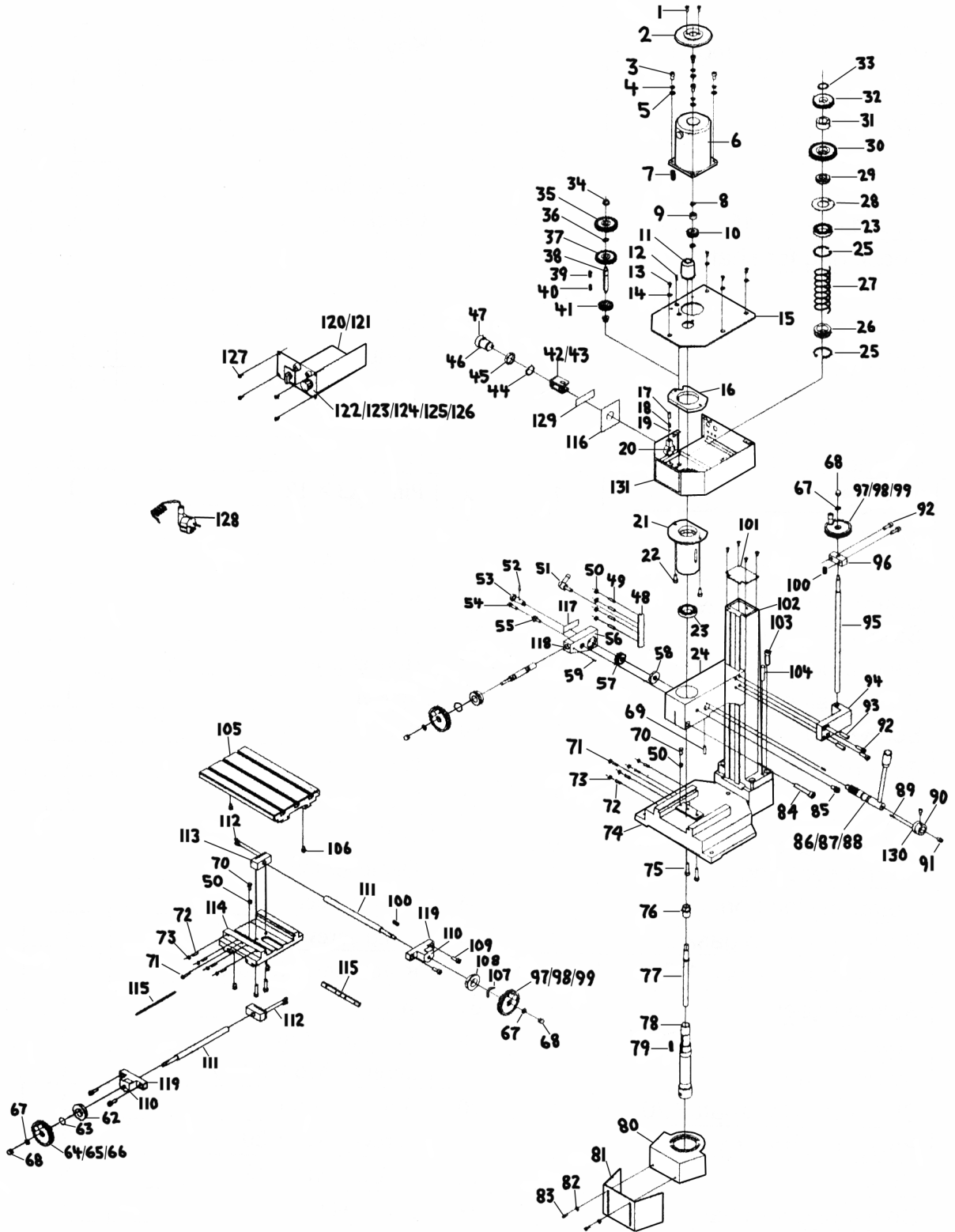
PARTS LIST

No.	Description	Q'ty	No.	Description	Q'ty
1	Screw M4*12	2	38	Shift shaft	1
2	Protect cover for motor	1	39	Key 4×8	1
3	Screw M6*12	4	40	Key 4×12	1
4	Spring washer 6	4	41	Change gear	1
5	Washer 6	4	42	Dila fork	1
6	DC motor	1	43	Flange lining	2
7	Round key 3*16	1	44	Check ring 21	1
8	Check ring for shaft 8	2	45	Spacer	1
9	Spacer	1	46	Variable speed control knob	1
10	Motor gear	1	47	Spring pin 2×12	1
11	Safety cover	1	48	Wedge	1
12	Screw M4×6	1	49	Screw M5×8	4
13	Screw M4×8	4	50	Nut M5	6
14	Washer 4	4	51	Handle	1
15	Up cover	1	52	Pin A3×12	1
16	Sleeve support plate	1	53	Joint shaft	1
17	Screw M6×5	1	54	Screw M5×18	1
18	Compression spring	1	55	Joint screw	1
19	Steel ball 5	1	56	Worm base	1
20	Gear-box	1	57	Helical gear	1
21	Spindle sleeve	1	58	Spacer	1
22	Screw M6×14	2	59	Pin A3×18	1
23	Bearing 61905-2Z	2	60	Key 2×18	1
24	Spindle box	1	61	Worm shaft	1
25	Check ring for hole 38	2	62	Dial	1
26	Spring seat ring	1	63	Damp spring	1
27	Compression spring	1	64	Hand wheel	1
28	Round nut stop gasket	1	65	Clutch	1
29	Round nut M24×1.5	1	66	Rotate small handle	1
30	Spindle gear	1	67	Washer 6	4
31	Spacer	1	68	Top nut M6	4
32	Spindle gear	1	69	Screw M6×20	1
33	Check ring for shaft 20	1	70	Bolt M5×12	2
34	Powder metallurgy bearing	2	71	Screw M4×20	2
35	Gear	1	72	Screw M4×18	8
36	Check ring for shaft 10	1	73	Nut M4	8
37	Change gear	1	74	Base	1

PARTS LIST

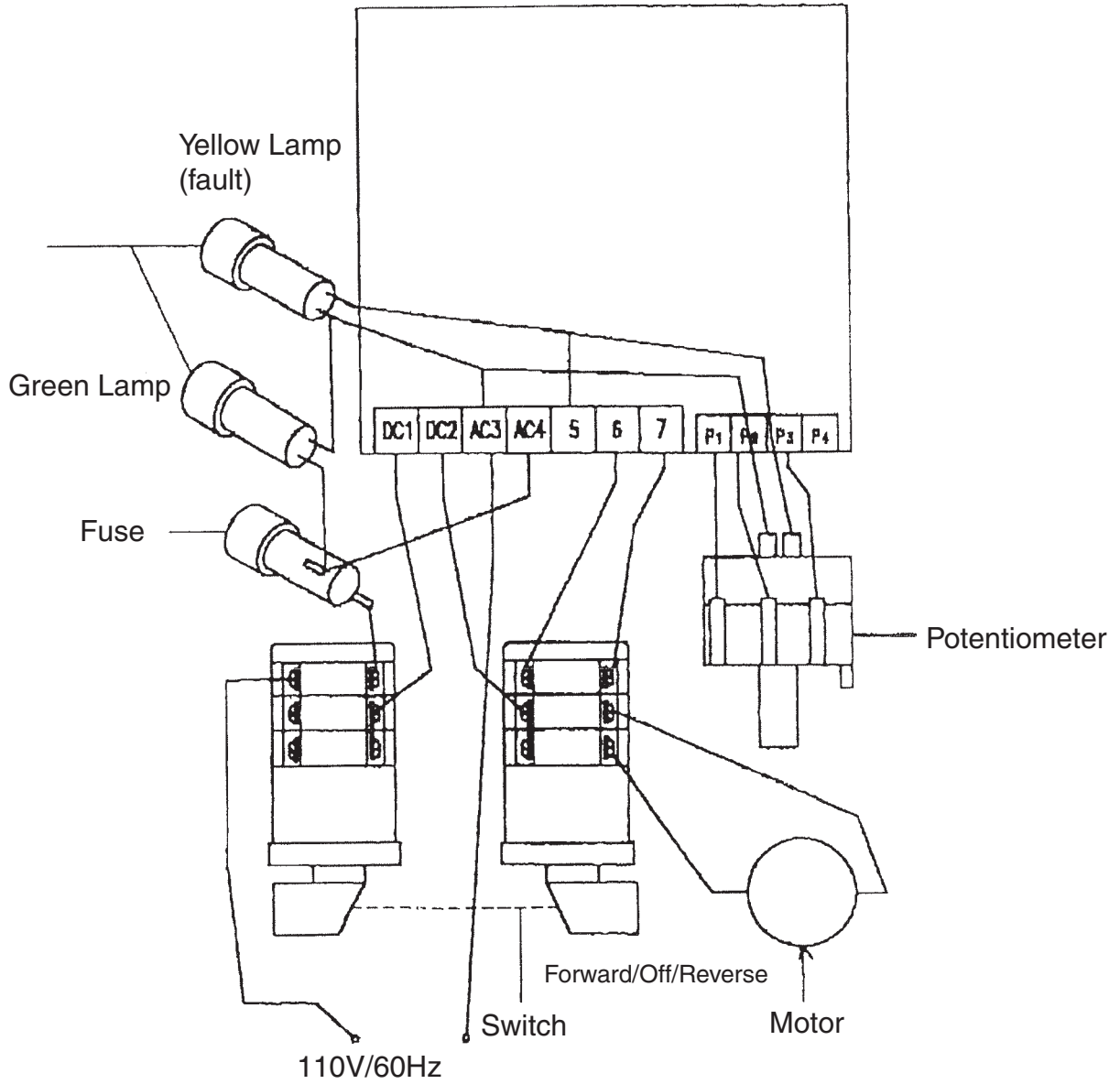
No.	Description	Q'ty	No.	Description	Q'ty
75	Screw M6×25	2	112	Screw M4×8	4
76	Compression nut	1	113	Screw nut	2
77	Lock screw	1	114	Saddle	1
78	Spindle	1	115	Wedge	2
79	Key 4×28	1	116	Change speed label	1
80	Protect cover	1	117	Joint label	1
81	Add long piece	1	118	0 position label	2
82	Washer 4	2	119	Dial label	1
83	Screw M4×10	2	120	Electricity box	1
84	Screw M8×50	1	121	PC Board	1
85	Fix screw	1	122	Variable Speed	1
86	Gear shaft	1	123	Fuse box	1
87	Handle shaft	1	124	High/Low Speed	1
88	Long handle sleeve	1	125	Forward/reverse switch	1
89	Spring pin 3×12	2	126	Electricity label	1
90	Mark show sleeve	1	127	Screw ST2.9×6.5	4
91	Screw M5×8	2	128	Power Cord/	1
92	Screw M6×20	4	129	Caution label	1
93	Pin 6×26	2	130	Spindle axis label	1
94	Nut block	1	131	Technical parameter label	1
95	Lifting screw	1			
96	Screw support	1			
97	Hand wheel				
98	Handle bolt	3			
99	Handle sleeve	3			
100	Key 3×10	3			
101	Cover board	1			
102	Fuselage	1			
103	Screw M8×30	4			
104	Pin 8×40	2			
105	Worktable	1			
106	Screw M5×6	4			
107	Damp spring	2			
108	Dial	2			
109	Screw M6×16	4			
110	Screw base	2			
111	Lengthways	2			

ASSEMBLY DIAGRAM

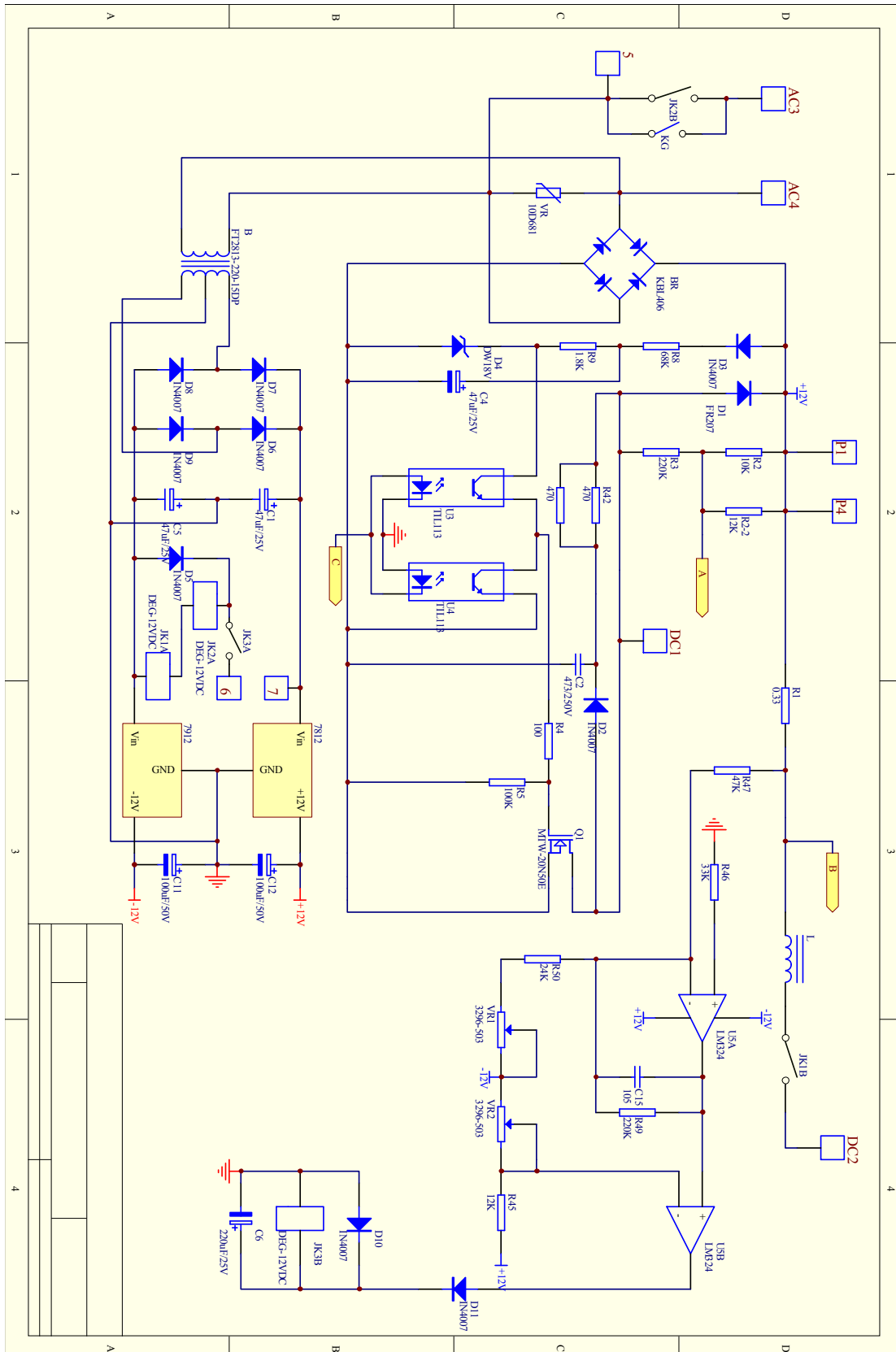


NOTE: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

SCHEMATIC DIAGRAM



WIRING DIAGRAM



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